CASE STUDIES OF ECONOMIC IMPACTS OF RAISED MEDIANS ON ADJACENT BUSINESSES: STUDY METHODOLOGY AND RESULTS

by

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ABSTRACT

The use of raised medians in urban areas has increased in recent years. Raised medians restrict access to businesses along a corridor by limiting turning movements to select mid-block locations. Therefore, a very common remark at public hearings related to the construction of raised medians is that there will be detrimental economic impacts on adjacent businesses. However, the restricted access allows more efficient signalization and traffic flow along the corridor, potentially providing more customers for the businesses. Although many studies on the affect on traffic operations exist, little research is available on the economic impact from raised medians on adjacent businesses and properties.

The authors of this paper have completed a four-year project developing and testing a methodology to collect and analyze data related to the economic impact of raised medians on adjacent businesses for the Texas Department of Transportation (TxDOT). This paper summarizes the findings of key economic indicators, as well as perceptions of business owners and managers. The research has found that installation of a raised median does not equate to economic losses by adjacent businesses. In fact, only two types of businesses (auto repair shops and gas stations) were found to generally experience losses in gross revenues. In almost all cases, employment did not change. This research is anticipated to be valuable for transportation professionals in both the public and private sectors who must provide estimates and expectations of the economic impacts of raised medians.

INTRODUCTION

Background

In recent years, transportation agencies have increased construction of raised medians on urban and suburban arterials. In addition to their use for access control, raised medians provide improved traffic operations and safety for a facility by separating opposing traffic flows and removing left-turning vehicles from the through lanes. With respect to access control, raised medians restrict left turns to mid-block and intersection median openings. While improving the operations and arterial signal coordination, the economic impacts of restricting these left turns may be felt by owners of businesses and properties adjacent to the arterial. Extensive research has investigated and quantified the costs and benefits of constructing raised medians with respect to initial costs and benefits to motorists in terms of reduced delay and increased safety. Prior to this research effort, however, limited research has been conducted to aid in estimating the economic impacts of raised medians on sales and property values for adjacent business and undeveloped landowners. The paper that follows is based upon the results of this four-year research effort (1,2,3,4).

Research Methodology

Participants in the survey included owners and managers of businesses adjacent to the corridors of interest. The research team first conducted a "windshield" survey to determine which businesses and land uses were present along the corridors in which the survey was to be administered. Business information (e.g., address and contact name) for each location was then obtained from the chamber of commerce, appropriate neighborhood/business groups, county appraisal district office, and/or telephone directories. For all but one of the corridors, the research team sent a letter of support from

the local chamber of commerce or neighborhood association encouraging the business owners and managers to participate in the survey. Finally, reminder cards were sent to the five case studies where mail-out surveys were administered to encourage business owners to return the surveys. In the final year of the study, surveys of customers wee performed along one corridor in College Station to compare to business owner responses.

Corridor Descriptions

The case studies include corridors with a variety of business mixes. Most of the corridors are in suburban-type areas with shopping centers and strip retail development. One of the corridors, Grant Avenue in Odessa, is located in a central business district. The specific types of development on the individual corridors ranges from completely retail to a mix of office, institutional, and retail. These development mixes drove the numbers of potential survey participants on each corridor. In addition, the cities included in the study reflect a variety of population sizes. The populations range from approximately 35,000 in McKinney to approximately 1.8 million in the City of Houston. Table 1 summarizes several different characteristics of interest for each case study location.

RESEARCH RESULTS

Importance of Access to Customers

One question on the business survey asked business owners to rank "accessibility to store" with other factors including, distance to travel, hours of operation, customer service, product quality, and product price in order of importance that customers use when selecting a business of their type. The results of this analysis by business type are shown in Table 2. In all cases, the accessibility to the

store ranked third or lower. Generally, accessibility was ranked lower than the items of customer service, product quality, and product price–all elements that business owners/managers themselves can directly influence. Customer surveys were also administered with this question as well. In all cases, the customers ranked accessibility with lower, or equal, value to the business owners. Accessibility is ranked as number two by the customers at one of the gas station locations after product price.

Impacts on Regular Customers

Another question of particular interest on the survey was business owner's perceptions of the impacts on regular customers due to the raised median installation. The business owners that were along the corridor before, during, and after the construction of the raised median indicated a smaller percentage of their regular customers would be less likely to visit their business as a result of the raised median compared to those business owners that were interviewed prior to the raised median installation (14.3 percent compared to 19.1 percent). Customers were also asked this question, and the majority of the customer survey responses match the business owner's selections at all five sites. Customers generally indicated that they would be less likely to visit the businesses during the construction phase of the project.

Impacts on Employment, Property Values, Accidents, and Traffic Volume

Impacts upon employment, property values, accidents, and traffic volume were also of interest. Results of these factors by business group are shown in Table 3. The "during" column in Table 3 indicates the impacts during construction relative to prior to the construction, and the "after" column

indicates the impacts after construction relative to prior to the construction. For all the business groups, the number of full-time employees increases on average. Business group two–those interviewed prior to the raised median installation–indicate that they felt the number of full-time employees would decrease slightly during construction while it actually increased 8.6 percent for the group one business owners. The perception of business owners was that property values increased 6.7 percent after the median installation (group one), but those business owners interviewed prior to the median installation expected a 2.3 percent decrease. The business owners also indicated a perceived decrease of 10.2 percent in accidents along with a 31.5 percent increase in traffic volumes.

Impacts on Customers Per Day and Gross Sales

Table 4 illustrates the impacts on customers per day and gross sales for the four business groups. "Gross sales where the median installed" refers to a question posed to business owners in which they were asked what they believe was/is the impact of the raised median for all businesses along the corridor where the median was installed. "Gross sales in the area" refers to a similar question that asked about gross sales for all other businesses in the area (not necessarily just the corridor) due to the raised median installation. One can quickly notice from Table 4 that the construction phase did seem to impact customers per day and gross sales as evidenced from the values in the "during" columns. Perceptions seem to indicate a larger expected loss in gross sales during construction (18.6 percent) compared to the percent reduction of 11.6 percent by those businesses that were present before, during, and after the median installation. Group one businesses also indicated an increase in customers per day and gross sales after the median installation while the group two businesses believed that there would still be a decrease. Group one also indicated an increase after the median

was installed for all businesses along the corridor where the median was installed and in the community surrounding the roadway improvement.

Impacts by Business Type

Table 5 provides results of analysis for group one businesses that have been present before, during, and after the median installation. The table presents the average percent change, standard deviation, and sample size by business type. One can see that the construction phase of the project appears to have a negative affect on many of the metrics of interest for many of the different business types. After construction of the raised median, gasoline stations, auto repair, and other services indicated a small negative affect on gross sales. These values are slightly lower for customers per day. Property values after construction are indicated as either rising or the same after the construction of the median, and there are only small changes in full- and part-time employees.

CONCLUSIONS AND RECOMMENDATIONS

It should be noted that the sample sizes upon which analyses were performed were often rather small; however, many observations and interesting points may be drawn from this research effort.

- ✔ The in-person surveys appear to provide more reliable data than the mail-out surveys, and these survey respondents appreciate the face-to-face opportunity to have their opinions heard. The average response rate for the in-person surveys was also much higher (55.0 percent) than the response rate for the mail-out surveys (9.0 percent).

- ✔ When asked to rank order the factors that affect customers endorsing their businesses, business owners generally ranked "accessibility to store" fourth or lower below some combination of customer service, product quality, and product price. According to business owners, it appears that the most important elements used by customers to determine what businesses they will endorse are factors that may be controlled by the business owners themselves to some extent. In surveys of customers at five selected businesses along the Texas Avenue corridor in College Station, it was found that customers ranked "accessibility to store" with lower, or equal, value to the business owners.

- ✔ When combining all business types, it was found that 85.7 percent of business owners whose businesses were present before, during, and after the median installation felt that their regular customers would be more likely (15.7 percent) or stay about the same in likeliness (70.0 percent) to endorse their business. In contrast, those businesses that were interviewed prior to the installation of the raised median indicated this percentage slightly lower (i.e., indicated more regular customers "less likely") at 80.9 percent. Therefore, for the case studies investigated in this project, the perceptions appear slightly more negative than what actually occurred along corridors where business owners were present before, during, and after the median installation. A similar question was posed to customers in College Station at the five selected businesses, and it was found that a majority of the customer survey responses matched the business owner's / manager's opinions. Generally, customers did indicate they were less likely to visit the business during the construction of the raised median.

- ✔ A majority of customers indicated that while the median made access more difficult, they indicated that customer satisfaction was better or that it remained about the same for the five businesses where customer surveys were performed.

- ✔ There was generally no change in the number of total employees along several of the corridors. Those corridors that did experience a decrease in the number of employees only experienced a decrease for one year and not over consecutive years.

- ✔ The construction phase seemed to impact customers per day and gross sales. For all businesses, perceptions again seem to indicate a larger expected loss in the businesses that were interviewed prior to the construction of the raised median. These business owners indicated they expected an 18.6 percent reduction in gross sales, while those that were present before, during, and after the median installation indicated an 11.6 percent reduction. After the construction phase, a 17.7 percent increase in customers per day was indicated along with a decrease in gross sales of 0.03 percent for all businesses present before, during, and after the median installation. Business types such as durables retail, specialty retail, fast-food restaurants, and sit-down restaurants indicated increasing customers per day, gross sales, and property values. Gas stations, auto repair, and other service businesses indicated decreasing customers per day and gross sales after the raised median was installed.

- ✔ The construction phase appears to have the most detrimental impacts on businesses. Suggestions to alleviate these impacts include, 1) ensuring adequate and highly visible access

to businesses during construction, 2) reducing construction time, and 3) performing the construction in smaller roadway segments (phases) to the extent possible.

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TABLE 1 Characteristics of Case Study Locations

Street Name	City and Population	Before Constr.	After Constr.	Study Limits	Length (miles)	Construction Years	Survey Type	Land Use	Number of Establishments
Texas Avenue	College Sta. 64,200	TWLTL	Raised Median	University Dr. to Dominik Dr.	1.5	1996 to 1998	Interview	Retail, University	59
South Post Oak Road	Houston 1,844,000	Undivided	Raised Median	I-610 to South Main Street	1.5	1988 to 1990	Interview	Retail, Industrial	155
Clay Road	Houston 1,844,000	Undivided	Raised Median	Hollister Rd. to Gessner Rd.	2.2	1994 to 1996	Mail-out	Retail, Industrial, Undeveloped	63
West Fuqua Road	Houston 1,844,000	Undivided	Raised Median	Hiram Clarke Rd. to Almeda Rd.	1.5	1987 to 1989	Mail-out	Retail, Undeveloped	68
Long Point Road	Houston 1,844,000	Undivided	Raised Median	Campbell Rd. to Hollister Rd.	0.7	Surveyed pre-constr.	Mail-out	Retail	41
Twin Cities Highway	Port Arthur 58,600	Raised Median	TWLTL	53rd Street to Griffing Park	2.0	1983 to 1985	Mail-out	Retail, Office	90
9th Avenue	Port Arthur 58,600	Undivided	Raised Median	Texas 365 to Lake Arthur Drive	1.5	1979 to 1980	Mail-out	Retail, Residential, Undeveloped	66
University Drive	McKinney 35,000	Undivided	Raised Median	U.S. 75 to Texas Highway 5	1.4	1991 to 1992	Interview	Retail, Residential	132
Loop 281	Longview 76,000	Flush Median	Raised Median	Spur 63 to Spur 502	0.6	1996	Interview	Retail	65
Call Field Road	Wichita Falls 98,200	Undivided	Raised Median	Kemp Blvd to Lawrence Street	0.3	Surveyed pre-constr.	Interview	Retail	55
Grant Avenue	Odessa 95,400	Undivided	Raised Median	2nd Street to 8th Street	0.6	1992	Interview	Retail, Office	42
Various	Amarillo 168,000	Raised Median	Undivided or TWLTL	Varies	Varies	Varies (1989-1995)	Interview	Retail	118

TABLE 2 Relative Importance Ranking of "Accessibility to Store" by Business Type

Business Type	Sample Size	Ranked Items					
		Distance to Travel	Hours of Operation	Customer Service	Product Quality	Product Price	Accessibility to Store
Durables Retail	2	5	5	2	2	1	5
Specialty Retail	23	6	5	1	2	3	4
Grocery	1	1	6	2	3	4	5
Gas Station	5	6	5	1	4	2	3
Fast-Food Restaurant	10	5	6	2	1	4	3
Sit-Down Restaurant	10	5	6	1	2	3	4
Medical	2	4	3	2	1	2	4
Auto Repair	6	5	3	1	2	4	6
Other Services	10	6	4	1	2	3	5

TABLE 3 Percent Change, Standard Deviation, and Sample Sizes of Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes by Business Group

Business Group	Full-Time Employees		Part-Time Employees		Property Values		Accidents		Traffic Volume	
	During	After	During	After	During	After	During	After	During	After
1	8.6% 28.3 55	3.2% 20.0 57	-3.3% 19.7 53	-0.3% 12.2 55	1.5% 10.3 31	6.7% 15.8 38	5.5% 23.7 40	-10.2% 27.1 40	-12.5 21.1 38	31.5% 50.7 44
2	-0.3% 1.1 19	0.3% 7.8 18	-0.2% 0.9 18	-1.0% 4.9 17	-8.2% 22.5 14	-2.3% 11.8 13	-3.3% 23.0 18	-13.2% 33.5 14	-11.1% 25.0 19	7.9% 20.5 17
3	-6.3% 17.7 8	9.4% 26.5 8	-6.3% 17.7 8	0.0% 0.0 9	-5.8% 14.3 6	4.7% 7.7 7	-7.1% 18.9 7	-10.7% 28.3 7	-8.8% 27.5 8	28.8% 20.5 8
4	0.0% 0 3	7.1% 18.9 7	0.0% 0.0 3	6.3% 17.7 8	-15.6% 22.4 9	7.7% 12.9 11	0.0% 0.0 6	6.7% 18.6 12	-21.9% 23.9 8	37.7% 89.3 11

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median had been installed.

Note: The "during" column indicates impacts during construction relative to prior to construction, and the "after" column indicates impacts after construction relative to prior to construction.

TABLE 4 Percent Change, Standard Deviation, and Sample Sizes of Customers per Day, Gross Sales, Gross Sales Along the Portion Where the Median Was (Will Be) Located, and Gross Sales in the Area

Business Group	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in the Area	
	During	After	During	After	During	After	During	After
1	-14.9% 30.6 54	17.7% 101.0 55	-11.6% 24.7 53	-0.03% 1.5 61	-16.4% 18.5 37	8.5% 20.5 35	7.6% 17.5 25	1.2% 7.1 22
2	-9.5% 31.8 18	-5.9% 10.0 16	-18.6% 24.8 19	-0.8% 1.6 16	-14.2% 17.2 13	5.4% 22.9 14	11.8% 14.5 14	2.7% 6.0 13
3	-15.6% 22.9 8	-3.9% 22.6 9	-17.9% 23.8 7	0.0% 1.2 9	-12.95% 18.7 7	13.6% 20.6 7	0.7% 15.9 7	0.7% 18.8 7
4	0.0% 0.0 2	50.0% 105.6 8	0.0% - 1	0.3% 1.5 7	-20.4% 17.8 12	12.9% 18.1 12	9.5% 13.7 11	5.9% 13.8 11

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median had been installed.

Note: The "during" column indicates impacts during construction relative to prior to construction, and the "after" column indicates impacts after construction relative to prior to construction.

TABLE 5 Summary of Average Percent Change, Standard Deviation, and Sample Size for Responses from Businesses Present Before, During, and After Raised Median Installation (Group One Businesses)

Business Type	Total Sample Size	Percent Change in Responses of Interest									
		Customers per Day		Gross Sales		Property Values		Full-Time Employees		Part-Time Employees	
		During	After	During	After	During	After	During	After	During	After
Durables Retail	2	15.0% - 1	5.0% - 2	15.0% - 1	1.0% - 2	1.0% - 1	17.5% 3.5% 2	- - 0	0.0% - 1	0.0% - 1	0.0% - 1
Specialty Retail	23	-6.6% 14.0% 19	8.1% 12.8% 18	-5.6% 15.6% 19	0.4% 1.2% 21	-1.0% 3.2% 10	3.7% 17.9% 13	22.0% 41.0% 20	1.0% 11.4% 20	0.9% 14.1% 19	-5.3% 16.8% 19
Gas Station	5	-20.4% 68.1% 5	-17.6% 23.3% 5	-40.4% 24.8% 5	-2.4% 1.3% 5	16.7% 28.9% 5	20.0% 26.5% 5	2.6% 19.1% 5	-5.0% 11.2% 5	-20.0% 44.7% 5	0.0% 0.0% 5
Fast-Food Restaurant	11	-19.9% 37.0% 8	108.9% 237.6% 9	-8.6% 36.1% 7	0.4% 1.5% 7	-17.0% 12.6% 3	16.7% 8.8% 6	-3.7% 26.6% 6	30.8% 46.3% 6	-15.3% 30.0% 7	3.0% 13.3% 7
Sit-Down Restaurant	10	-6.1% 8.8% 7	2.6% 3.6% 7	-3.6% 10.6% 7	0.8% 0.4% 10	0.0% 0.0% 4	0.0% 0.0% 4	1.8% 5.0% 9	3.5% 8.2% 10	1.8% 5.0% 9	5.0% 10.5% 10
Auto Repair	7	-24.0% 25.1% 5	-5.0% 11.2% 5	-20.0% 24.5% 6	-0.5% 1.2% 6	3.3% 5.8% 3	3.3% 5.8% 3	0.0% 0.0% 5	0.0% 0.0% 5	0.0% 0.0% 4	0.0% 0.0% 4
Other Services	12	-32.5% 35.7% 8	-8.4% 9.3% 8	-17.5% 36.6% 6	-1.0% 1.7% 8	2.0% 4.5% 5	7.6% 10.8% 5	3.1% 5.9% 8	-4.4% 18.8% 8	0.0% 0.0% 7	1.4% 3.8% 7

Note: Each cell contains the average percent change (top), standard deviation (middle), and number of observations (bottom).

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